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SmartView 3D Delivers Speed and Low Dose for CT-guided Interventions

Hugues Brat, MD, is an interventional radiologist at Groupe 3R, a private multicenter radiology group based in the Valais Region of southwest Switzerland. CT interventions are performed in collaboration with Clinique de Valère, a private acute care hospital in Sion. Over the last few years, Dr. Brat has worked with GE Healthcare to develop software that increases safety, precision and speed across interventional procedures.

The result of that collaboration is GE Healthcare's new SmartView™ 3D software, recently installed at Clinique de Valère.

Designed to enable 3D CT-guided intervention, SmartView 3D delivers multiplanar reconstruction (MPR) images of the needle based on frame reference and needle tip tracking, displayed in less than 1.5 seconds after acquiring the 2D images. The needle and needle tip position are automatically detected on the intuitive display with an extended line indicating needle direction. Slice thickness of 0.625 mm with a 10 mm and 20 mm z-coverage help improve visualization to simplify complex procedures and minimize dose.

“SmartView 3D increases the confidence interval in interventional radiology,” he says. “Before SmartView 3D, we were at very low dose levels already. Now the software enables us to be faster so we have less radiation to the patient

and our dose records are some of the lowest that you will find anywhere,” he says.

Dr. Brat notes that he usually works with 10 mm coverage to minimize dose to the patient. “If you work with 20 mm coverage, the patient is exposed to a little bit more dose. But what is important is that you adapt to your target. If you have a 2 mm target, you work with very thin slices, such as 5 mm slices. If you have a large target, like a 3 or 4 cm long lymph node, you can work with the 20 mm coverage.”

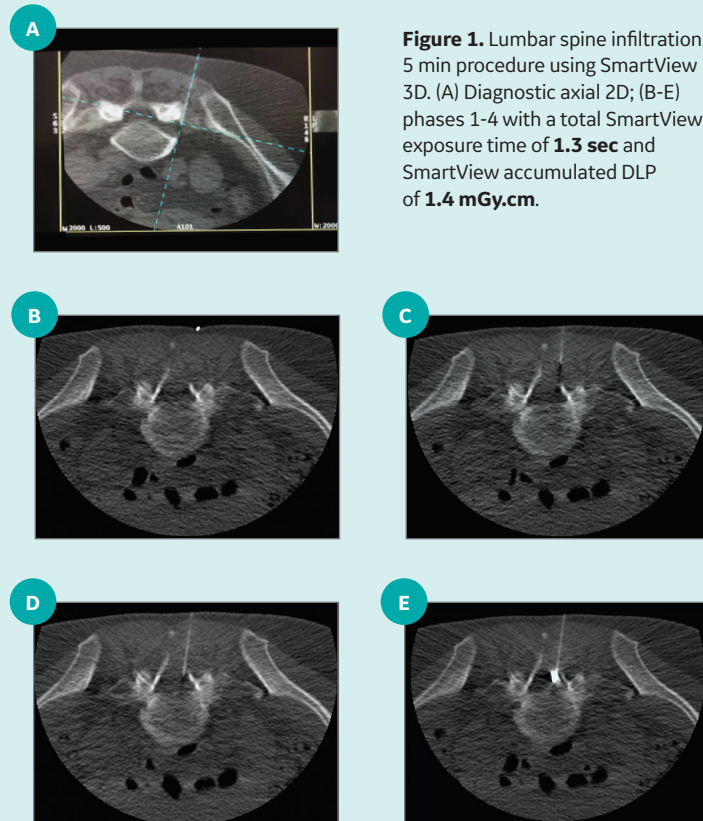


Figure 1. Lumbar spine infiltration, 5 min procedure using SmartView 3D. (A) Diagnostic axial 2D; (B-E) phases 1-4 with a total SmartView exposure time of **1.3 sec** and SmartView accumulated DLP of **1.4 mGy.cm**.



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In complex procedures, such as vertebroplasty, deep biopsies or palliative care neurolysis, time is of the essence. Many patients are in a critical condition or in extreme pain that requires quick intervention without compromising precision and reliability. SmartView 3D enables Dr. Brat to work faster while maintaining high quality.

“SmartView 3D increases our precision in the needle positioning related to the target and its surrounding tissue,” he says. “Now, with SmartView 3D we have MPR reconstructions in less than 1.5 seconds every time we push on the pedal,” Dr. Brat adds.

Once he completes a target scan, the software allows him to mark an area of interest. Then the table automatically moves into the correct position to place the target at the center of the image for intervention.

SmartView 3D’s needle-tip tracking recognizes the needle angle and reconstructs images in the needle plane to provide enhanced localization of the needle tip and visualization of surrounding tissues—even in challenging approaches, such as a cranial-caudal approach, an oblique view or using a curved needle.

“That’s one very important aspect because sometimes we have an ascending approach in order to go under the liver to biopsy a small lymph node, and so we need to have an oblique approach. And the software shows us the needle completely,” he says.

Dr. Brat uses several types of needles, from 10-gauge needles to 25-gauge needles, and has seen success with each size. “We didn’t

face any issues regarding needle tip detection as the software helps detect the needle. If you adapt your X-ray exposure to the size of the patient and not the size of the needle, you can achieve needle tip detection,” he says.

SmartView 3D places a green cross at the needle tip to indicate the location of the needle and its intended path (Figure 1A).

“Sometimes it’s not that easy to reach a 1 mm target with the right angle. The green cross guides you very well in that respect to indicate if you have to slightly modify your angle or inclination in order to reach the target with the needle,” he says.

“When creating this software, speed was a key factor. So, we really insisted on the fact that we needed something that was fast and close to a one second reconstruction. Today we have this situation with SmartView 3D and it’s working very well,” Dr. Brat says. ■

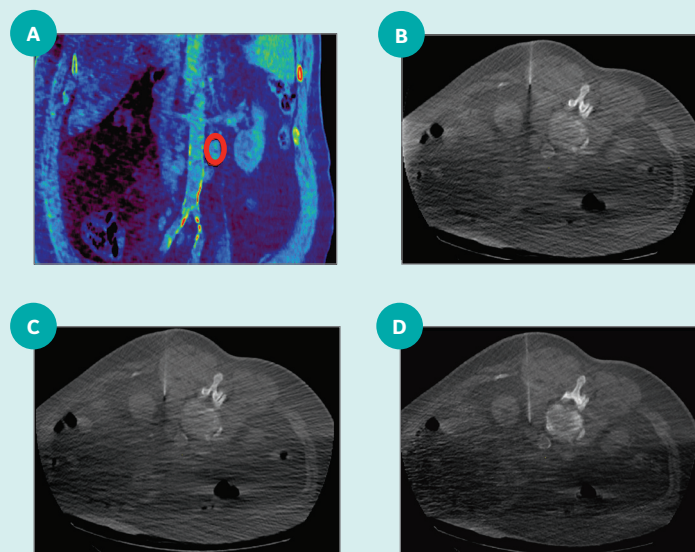


Figure 2. Diagnostic biopsy of a 15 cm deep lymph node metastasis that is difficult to access and is located near the aorta in an obese patient (BMI of 41 kg/m²). (A) Volume-rendered CT; (B-D) Showing three of four phases with a SmartView 3D exposure time of **7.5 sec** and SmartView 3D accumulated DLP of **80.15 mGy.cm**.